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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	David K. Poulsen et al.	§	Group Art Unit:	2192
Serial No.:	10/039,789	§	Examiner:	Michael J. Yigdall
Filed:	January 2, 2002	§	Atty. Dkt. No.:	ITL.0663US (P12629)
For:	Providing Parallel Computing Reduction Operations	§	Assignee:	Intel Corporation

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REPLY BRIEF

Sir:

In response to the new arguments raised in the Examiner's Answer, the following reply brief is submitted.

1. The Asserted Equivalency Between Appellants' Figure 2 and Poulsen's Figure 1

The Answer makes the point that there are similarities between Appellants' Figure 2 and Poulsen's Figure 1. Of course, this is a result of the way the present application progresses. It explains the general and moves to the specific. Thus, the fact that there are similarities at the general level between the Appellants' disclosure and the Poulsen patent serves only to highlight that the devil is in the details. While there may be similarities at a high level, at the level set forth in the claim, these similarities evaporate.

For example, the claim calls for receiving a first program unit in a parallel computing environment, the first program unit including the reduction operation associated with a set of

Date of Deposit: December 29, 2006
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variables. This is illustrated in connection with Figure 5, element 501 and discussed in the specification at page 10, line 18. The first program unit is translated into a second program unit, the second program unit "including a set of one or more instructions to partition the reduction operation between a plurality of threads including at least two threads and it references a third program unit." This would correspond to element 503 in Figure 5. See the specification at page 10, line 24. Then, the first program unit must be translated into a third program unit, the third program unit "including a set of one or more instructions that encapsulate the reduction operation and perform an algebraic operation on the variables." This is represented by element 505 in Figure 5. See the specification at page 11, lines 1-9. Encapsulation enables the run-time library implementation of the reduction to be independent of the particular arithmetic operation for which a directive may be used. Specification at page 11, lines 5-9.

While the office action suggests that this third program unit is somehow taught by Sundaresan, there is no teaching in Sundaresan of any encapsulation of the type claimed. Therefore, there is a missing element in that neither of the two references teach the claimed limitation.

The Examiner's attempt to read the claims onto the second code 204 is a continuation of the misapplication of the Appellants' disclosure. Namely, the Examiner simply focuses on the two general embodiments, which were used for illustrative purposes, to attempt to mistakenly apply the claim to the reference. There is nothing in the discussion of the second program unit 204 in the specification that shows the detail set forth in the claim.

For example, the assertion that the block 305 corresponds to the recited third program unit may be true at the general level, but the disclosure of the block 305 does not have the detail set forth in the claim, namely, the program unit including a set of one or more instructions that encapsulate the reduction operation to perform an algebraic operation on the variables. These claim elements are simply read out of the claim by applying the claim to the more general embodiment in the Appellants' specification and then showing alleged equivalency between the embodiment which is more general than what is claimed and the cited reference.

The argument on page 14 that a program unit is just any collection of statements, even if true, ignores the rest of the claim which calls for the third program unit to have certain characteristics, namely, a set of one or more instructions that encapsulate the reduction operation to perform an algebraic operation on the variables. In support of this proposition, the Examiner

cites column 1, lines 56-63. However, this material does not even refer to an encapsulation. Simply because a reduction operation relates to algebraic variables does not teach a third program unit that encapsulates the reduction operation to perform an algebraic operation of the variables.

The Examiner seems to concede as much, also citing in support of this proposition, column 5, lines 7-14. However, again, there is no discussion of encapsulation, contrary to the assertion in the Examiner's arguments on page 18. All this material talks about is separating the reduction object template and type specific reduction object from the actual reduction operation, allowing the same reduction skeleton object to be used for all reduction operations within a rope. It is not seen how this could possibly meet the claimed limitation of receiving a first program unit and translating it into a second program unit and a third program unit where the third program unit includes a set of one or more instructions that encapsulate the reduction operation to perform an algebraic operation of the variables. This being so, there is essentially a missing element and no effort is made to provide a rationale to modify either of the references to meet this element.

2. **The Rationale to Combine**

Ignoring the requirement of the rationale to modify to meet the missing element, the Examiner proceeds to analyze whether or not there is a rationale to combine. On page 19, the Answer suggests that Sundaresan teaches encapsulating a reduction operation, now based on column 5, lines 7-14 previously cited, and also on lines 21-23 and 30-33. A review of this material demonstrates that it is totally uninforming. It does not teach what the Examiner says it teaches and amounts to nothing but general information. It does not meet the specificity of teaching encapsulation or even a specific encapsulation of the reduction operation to perform algebraic operations.

Initially, it should be noted that the skeleton referred to in Sundaresan at column 5, lines 7-14 is better explained at column 7, starting at line 54. It is clear from reviewing this material that it has nothing to do with encapsulating reduction operation to perform algebraic operations on variables. Instead, it is a fan-in tree and a fan-out tree. See column 7, lines 54-55. Understandably, the Answer relies on the general discussion in the background, rather than the specific discussion under the description of the preferred embodiment.

Even if the missing element problem were overcome, there is total absence of a rationale to combine. The asserted desirability of the combination, set forth on page 19, lines 8-10 of the Examiner's Answer, are unsupported. They simply assert a benefit from the claimed combination and claim that because the claimed combination is good, it would have certain advantages, it would be obvious. This turns the patentability analysis on its head.

The discussion on page 19 of the Examiner's Answer, starting with the line "Moreover, the translation means 120 of Poulsen ..." is interesting, but seems to have nothing to do with showing the rationale to combine. For example, the Examiner suggests that because enhancing parallelism and performance of a computer program is an advantage of Poulsen's translation, there is a suggestion or motivation to imply the translation of Sundaresan's parallel computing program. This amounts to the argument that because everybody wants to do the best they can, you can simply combine everything in the same field, in this case, the field of parallel computing.

It is also asserted that "Sundaresan even suggests that the reduction operation incorporates global storage objects suitable for privatization." Even if this is so, it provides no rationale to provide a second translation of the first program unit in a third program unit that includes one or more instructions that encapsulate the reduction operation.

Therefore, the rejection should be reversed.

Respectfully submitted,

Date: December 29, 2006

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